

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	400	interpolat\$3 with phase with quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 08:47
L2	14	interpolat\$3 with phase with quadrature with adjust\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:43
L3	1	interpolat\$3 with phase with quadrature with adjust\$3 and (eye with diagram)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 09:03
L4	1	((interpolat\$3 with phase with adjust\$3) same quadrature) and (eye with diagram)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 09:03
L5	6	((interpolat\$3 same phase same adjust\$3) same quadrature) and (eye with diagram)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 09:56
L6	2	"4805191".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 09:54
L7	2	"6731697".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:06

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L8	59	((interpolat\$3 and phase and adjust\$3) and quadrature) and (eye adj diagram)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:54
L9	2	"6,359,878".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 09:59
L10	2	"6,097,794".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:00
L11	2	"5,872,836".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:00
L12	2	"5,065,409".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:07
L13	2	"5,724,413".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:07
L16	56	(clock adj recovery) with (phase adj interpolator)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 11:26

EAST Search History

L17	10	(clock adj recovery) with (phase adj interpolator) and quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:50
L18	12	(clock adj recovery) same (phase adj interpolator) and quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:50
L19	26	(clock adj recovery) and (phase adj interpolator) and quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:53
L20	3118	375/371	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:54
L22	3986	375/354	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:54
L23	4027	((interpolat\$3 and phase and adjust\$3) and quadrature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:54
L24	316	interpolator and (phase near3 adjust\$3) and quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:55

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L25	84	interpolator same (phase near3 adjust\$3) and quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:55
L26	19	20 and 25	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:55
L27	10	22 and 25	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 10:59
L28	23	("4692931" "4815103" "5016206" "5093841" "5202901" "5255289" "5259005" "5283815" "5309482" "5311544" "5343498" "5425057" "5504785").PN. OR ("5602879"). URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 11:13
L29	26	("5386239" "5504785" "5535252" "5610948" "5612975" "5724396" "5793818").PN. OR ("5878088").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 11:17
L30	0	("2004/0037366").URPN.	USPAT	OR	ON	2007/03/20 11:24
L31	0	("2004/0037366").URPN.	USPAT	OR	ON	2007/03/20 11:25
L32	47	(clock adj recovery) with (phase with interpolator) and quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 11:54
L33	56	(clock adj recovery) with (phase adj interpolator)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 14:46

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L34	1	(clock adj recovery) with (interpolator) with quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 11:58
L35	9	(clock adj recovery) same (interpolator) same quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 14:18
L36	3	"6,671,342".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 12:05
L37	23	("4692931" "4815103" "5016206" "5093841" "5202901" "5255289" "5259005" "5283815" "5309482" "5311544" "5343498" "5425057" "5504785").PN. OR ("5602879"). URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 12:45
L38	87	interpolator with correlator	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:38
L39	37	interpolator with correlator and quadrature	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:36
L40	1	interpolator with correlator and quadrature and clock adj recovery	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 12:47
L41	160	(clock adj recovery) and (interpolator) and quadrature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 14:18
L42	22	22 and 41	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 14:18

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L43	0	interpolator with correlator and pliphase	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:39
L44	0	interpolator with correlator and pliphaseo	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:39
L45	10	interpolator with correlator and polyphase	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:42
L46	0	interpolator with correlator and "poly-phase"	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:43
L47	8	interpolator and correlator and "poly-phase"	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:43
L48	120	interpolator with polyphase	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:48
L49	7	interpolator with polyphase and clock adj recovery	US-PGPUB; USPAT; USOCR	OR	ON	2007/03/20 14:43
L50	8142	chip adj die	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:24
L51	2	1 and 50	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:25
L52	1	33 and 50	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:26
L53	1	41 and 50	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:26

EAST Search History

L54	4	23 and 50	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:26
L55	1	24 and 50	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:27
L56	1	8 and 50	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:27
L57	6	(interpolat\$3 with phase with quadrature with adjust\$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:44
L58	12	(interpolator and phase and quadrature and adjust and "in-phase").clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/20 19:45
S1	1	"10/396118"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/06/27 08:40
S2	1	10/748236	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/03/19 21:11

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interpolator phase adjust quadrature "eye diag

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The system of claim 1, wherein the second **interpolator** adjusts the **phase** of the **quadrature** signal to coincide with a predetermined point on an **eye diagram**. ...
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Modem with improved timing recovery using equalized data - Patent ...

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uous **phase interpolation** (PI) between the **quadrature** outputs of. the full-rate clock divide by two is implemented in order to ex- ternally **adjust** the ...
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phase interpolation with 3-b resolution between them. Since. there are four pairs of phases, ... **phase** selection at the **quadrature phase** boundaries for the ...
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shows a typical design of the **phase interpolator**. The **phase interpolator** generates the **phase** by forming. a weighted sum of the **quadrature** phases of the ...
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Synchronization :: Using the Libraries (Communications Blockset)

The controller uses the **phase** estimates to determine the interpolating instants that the **interpolator** uses in the next cycle. ...

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Generate **eye diagram** to visualize PAM signal quality ... Carrier detection and **phase adjustment**. Design of receive filter. Probability of error analysis to ...
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Adjusting the relative drive strength between two sets of tri- state inverters enables variable-weight **interpolation**. A **phase**- ...
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Digital PSK-type demodulator having clock recovery before carrier ...

4 shows the appearance of the **eye diagram** for a QPSK modulating signal; ... In this case,

the clock 32 has a **phase adjustment** input 34. The values c, cj, ...

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Index Terms—Analog **quadrature phase interpolator**, chip-to- ... Despite the use of an analog PI, the **phase adjustment** of the ...

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- ☐ 1. [No Title](#) [PDF-239K]
 Nov 2003
 ...instantaneous frequency of the VCO is **adjusted** to align the **phase** of the VCO output with the **phase** of...error - ^ . Two approaches to carrier **phase** synchronization can be envisioned. In the first approach, **phase** compensation is performed at the output...filter as illustrated in Figure 3.7. The **quadrature** sinusoids used for downconversion are...
[\[http://www.ee.byu.edu/class/ee485public/ee485.fall.03/...\]](http://www.ee.byu.edu/class/ee485public/ee485.fall.03/...)
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 ...81 4.2.1 Low-Frequency Dynamic **Phase** Noise Tracking Loop.....83
 4.2.2 **Phase** Noise Measurements...19 Figure 2.4: **Phase**-locked loops: (a) VCO based PLL, and...Self-biased replica-feedback circuit dynamically **adjusts** the bias voltages of the symmetric-load...
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 ...3-9 CPM **Phase** Tree Demo...3-34 **Phase** Noise Effects in 256-QAM - Demo...3-41 vi Contents **Phase** Detector...
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- ☐ **6. HIGH PERFORMANCE INTER - CHIP** [PDF-232K]
 Oct 2001
 ...37 3.2.2 Duty Cycle **Adjuster** Design...99 5.2.2 **Phase Interpolator**...39 Figure 3.11:
Phase detector: (a) conceptual...Figure 3.12: Duty cycle **adjuster** schematic...24:
 Received data **eye diagram**...Figure 4.25: Duty cycle **adjuster** effectiveness...82 Figure
 5.1: **Phase** locked loops (a...
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- ☐ **7. E:\alevi\dir.text\dir.bindu\PhD Thesis\BinduThesis.pdf** [PDF-793K]
 Nov 2002
 ...Synthesizer Design 124 4.1 **Phase** Locked Loops...178 4.3 **Phase** Frequency
 Detector...180 4.3.1 Digital **Phase** Frequency Detector...Fig. 3.14 Measured (a) output
eye-diagram and (b) output jitter of 9...
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- ☐ **8. Digital Communication with AO - 40 and** [PS-198K]
 Jul 2001
 ...Abstract AMSAT OSCAR 40 (also known as **Phase-3D**) is the latest and greatest
 satellite...to advance science and education. As all **Phase-3** satellites do, it continuously
 transmits...13 2.3.2 Squaring Loop Carrier **Phase** Estimation...
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Vichienchom, Kasin, Feb 2003
 ...Transceiver with 2x Oversampling Linear **Phase** Detector (Under the direction of
 Professor...uses multiple clock phases from a multi-**phase phase**-locked loop (MPLL)
 operating at...40 viii Figure 2.28 **Phase interpolator**...
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- ☐ **10. A multi-gigabit CMOS transceiver with 2x oversampling linear phase detector**
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Abascal, Carlos., Jan 2003
 ...16 Figure 2.4: The 8VSB **Eye Diagram** at each sampling time...89 Figure 5.1:
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- ☐ **12. ADAPTIVE EQUALIZATION OF A RADIO FREQUENCY AMPLIFIER**
ABASCAL, CARLOS G., Jan 2001
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 Spectrum and **Eye Diagram** of the Digital signal from inside the exciter. .95 Figure...
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☐ **13. METHODS AND SYSTEMS FOR DIGITALLY PROCESSING OPTICAL DATA SIGNALS**

GOPINATHAN, Venugopal, *PATENT COOPERATION TREATY APPLICATION*, Feb 2002

...compensate for timing **phase** errors in the clock...00231 FIG. 2 is an **eye diagram** of a digital signal...00241 FIG. 3 is an **eye diagram** of a digital signal...00251 FIG. 4 is an **eye diagram** of a digital signal...example analog **phase interpolator** that can be implemented...

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☐ **14. Modem with improved timing recovery using equalized data**

Burch, Richard A. / McMahan, Dennis B. / Yedid, Harry, *UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT*, Feb 1989

...an output of equalized **quadrature** data I and Q which are...signal provides an input to **phase** locked loop (PLL) 28 which...baud represented in this **eye diagram**. The timing of FIG. 3 would...inherently attempts to **adjust** the sample signal timing...T/2 rate. The equalized **quadrature** data I and Q are input to **interpolator** 30 which provide corresponding...of an even order linear **phase** filter which preferably...

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☐ **15. SYMBOL TIMING RECOVERY METHOD FOR LOW RESOLUTION MULTIPLE AMPLITUDE SIGNALS**

RAO, Roopa, *PATENT COOPERATION TREATY APPLICATION*, Apr 2002

...modulation techniques (**Quadrature** Amplitude Modulation (QAM), or **Quadrature Phase Shift Keying** (QPSK), for...receiver to continually **adjust** (or adapt) to maintain...digitized signal to an **interpolator** 220. Meanwhile, a controller...identifies the symbol edge and **adjusts** the **phase** of detector 330 such that...to be recovered For the **eye diagram** of fig 4 A, the detector...

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☐ **16. DUAL MODE QAM/VSB RECEIVER**

JAFFE, Steven T. / LIU, Tian-Min / TAN, Loke, Kun, *PATENT COOPERATION TREATY APPLICATION*, May 2000

...single bit LMS derotator coupled to **adjust phase** offset of signals directed to an...first tracking loop; a variable rate **interpolator**; an NTSC interference rejection filter...Nyquist filter, the second derotator **adjusting** the received spectrum to a baseband...operative in response to a first-**phase** portion of a complex signal, and...symbols characterized by in-**phase** and **quadrature-phase** portions separated in time...

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☐ **17. Non-data-aided maximum likelihood based feedforward timing synchronization method**

Lakkis, Ismail / O'Shea, Deirdre / Tayebi, Masood K. / Hatim, Baya, *UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT*, Mar 2002

...first decision device is for the in-**phase** and another for the **quadrature** data branches. The term hard decision...decision devices (not shown) for the in-**phase** and **quadrature** data branches of the received signal...forms the magnitude-squared of the in-**phase** and **quadrature** samples. The second squaring operation...

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- ☐ **18.** [Host computer digital signal processing system for communicating over voice-grade telephone channels](#)

Suffern, Robert C. / Norrell, Andrew L., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Aug 2000

...values from the interface card and performs band-splitting and **phase**-splitting digital filtering to create filtered samples for...the host computer's screen to provide an oscilloscope-like **eye-diagram** display useful for monitoring the performance of the system...

Full text available at patent office. For more in-depth searching go to  LexisNexis™

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- ☐ **19.** [ALIGNMENT METHOD AND APPARATUS FOR RETRIEVING INFORMATION FROM A TWO-DIMENSIONAL DATA ARRAY](#)

LAYBOURN, Loren / BLAHUT, Richard E. / RUSSELL, James T., PATENT COOPERATION TREATY APPLICATION, Nov 1997

...generation of polynomials, make use of in-**phase** and **quadrature** spatial reference signals to modulate...this manner, the combination of in-**phase** and **quadrature** spatial reference signals generates...independent measure of the timing signal **phase** as a function of position along the...

Full text available at patent office. For more in-depth searching go to  LexisNexis™

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- ☐ **20.** [Host computer digital signal processing system for communicating over voice-grade telephone channels](#)

Suffern, Robert C. / Norrell, Andrew L., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Feb 1999

...values from the interface card and performs band-splitting and **phase**-splitting digital filtering to create filtered samples for...the host computer's screen to provide an oscilloscope-like **eye-diagram** display useful for monitoring the performance of the system...

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☐ **21. FSK discriminator**
Hughes, Patrick M. / Hall, Martin C. / Lind, Larry F., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Nov 1991

 ...mutually in **phase quadrature** and means for forming...signals, mutually in **phase quadrature**, at the keying frequency...illustrates a typical **eye diagram**; FIG. 5 illustrates...which are mutually in **phase quadrature** and means for forming...

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☐ **22. FSK discriminator**
Hughes, Patrick Michael / Hall, Martin Christopher / Lind, Larry Frederick, EUROPEAN PATENT, Mar 1989

 ...usually in a continuous **phase** manner. The general...of the FIR filter, **quadrature** pairs are used with...illustrates a typical **eye diagram**; Figures 5a to 5c...illustrated in the **eye diagram** of figure 4. In order...option is to employ an **interpolator** 22 which interpolates...provides the necessary **phase quadrature** frequency discrimination...

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☐ **23. FSK DISCRIMINATOR**
HUGHES, Patrick, Michael / HALL, Martin, Christopher / LIND, Larry, Frederick, PATENT COOPERATION TREATY APPLICATION, Feb 1989

 ...mutually in **phase quadrature**, at the keying...illustrates a typical **eye diagram**; and - Figure...the signal **phase** at the intersymbol...illustrated in the **eye diagram** of figure 4...to employ an **interpolator** 22 which interpolates...Ik-4. 51 The **interpolator** 6 carried out...iteratively **adjusted**, as follows...the necessary **phase quadrature** frequency discrimination...

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☐ **24. Host computer digital signal processing system for communicating over voice-grade telephone channels**

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Suffern, Robert C. / Norrell, Andrew L., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Mar 1998

...values from the interface card and performs band-splitting and **phase**-splitting digital filtering to create filtered samples for...the host computer's screen to provide an oscilloscope-like **eye-diagram** display useful for monitoring the performance of the system...

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- ☐ **25. [Host computer digital signal processing system for communicating over voice-grade telephone channels](#)**

Suffern, Robert C. / Norrell, Andrew L., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Jul 1997

...values from the interface card and performs band-splitting and **phase**-splitting digital filtering to create filtered samples for...the host computer's screen to provide an oscilloscope-like **eye-diagram** display useful for monitoring the performance of the system...

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...37 3.2.2 Duty Cycle **Adjuster** Design...99 5.2.2 **Phase Interpolator**...39 Figure 3.11: **Phase** detector: (a) conceptual...Figure 3.12: Duty cycle **adjuster** schematic...24: Received data **eye diagram**...Figure 4.25: Duty cycle **adjuster** effectiveness...82 Figure 5.1: **Phase** locked loops (a...

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- ☐ **27. [HIGH PERFORMANCE INTER - CHIP](#)** [PDF-249K]
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...37 3.2.2 Duty Cycle **Adjuster** Design...99 5.2.2 **Phase Interpolator**...39 Figure 3.11: **Phase** detector: (a) conceptual...Figure 3.12: Duty cycle **adjuster** schematic...24: Received data **eye diagram**...Figure 4.25: Duty cycle **adjuster** effectiveness...82 Figure 5.1: **Phase** locked loops (a...

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Dec 2002

...21 2.2.1 **Phase** Portrait Analysis...Majority-voting for decimating multiple **phase** detector outputs: (a) circuit...87 4.17 Digital **phase interpolator**...7V . . . 96 5.5 Transmitter **eye diagram** of the adaptive-supply serial...

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...21 2.2.1 **Phase** Portrait Analysis...Majority-voting for decimating multiple **phase** detector outputs: (a) circuit...87 4.17 Digital **phase interpolator**...7V . . . 96 5.5 Transmitter **eye diagram** of the adaptive-supply serial...

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...51 4.4.1 Digital **Phase** Detector...11 Figure 2.7: PLL **Phase** Noise Spectrum...13
Figure 2.9: Clock **Interpolator**...67 Figure 5.5: PLL **Phase** Noise vs. Noise Frequency...
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...72 Figure 4.12. **Phase**-only detector...74 Figure 4.13. **Phase** detector transient
waveforms...93 Figure 4.27. **Phase** interpolation...95 Figure 4.28. Digital
interpolator...96 Figure 4.30. Duty-cycle **adjuster** schematic...
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...72 Figure 4.12. **Phase**-only detector...74 Figure 4.13. **Phase** detector transient
waveforms...93 Figure 4.27. **Phase** interpolation...95 Figure 4.28. Digital
interpolator...96 Figure 4.30. Duty-cycle **adjuster** schematic...
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- ☐ **34. [Data Converters for High Speed CMOS Links](#)** [PDF-185K]
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...nonlinearity, clock coupling, and static **phase** errors are also digitally corrected.
Time...51 4.4.1 Digital **Phase** Detector...67 Figure 5.5: PLL **Phase** Noise vs. Noise
Frequency...
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IEEE JNL IEEE Journal or Magazine

IET JNL IET Journal or Magazine

IEEE CNF IEEE Conference Proceeding

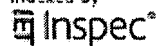
IET CNF IET Conference Proceeding

IEEE STD IEEE Standard

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» Key

IEEE JNL IEEE Journal or Magazine

IET JNL IET Journal or Magazine

IEEE CNF IEEE Conference Proceeding

IET CNF IET Conference Proceeding

IEEE STD IEEE Standard

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- ☐ 1. **A double Nyquist digital product detector for quadrature sampling**
 Pellon, L.E.;
[Signal Processing, IEEE Transactions on \[see also Acoustics, Speech, and Sig IEEE Transactions on\]](#)
 Volume 40, Issue 7, July 1992 Page(s):1670 - 1681
 Digital Object Identifier 10.1109/78.143439
[AbstractPlus](#) | Full Text: [PDF](#)(1012 KB) IEEE JNL
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- ☐ 2. **A high-resolution interpolator for incremental encoders based on the qua method**
 Emura, T.; Lei Wang;
[Industrial Electronics, IEEE Transactions on](#)
 Volume 47, Issue 1, Feb. 2000 Page(s):84 - 90
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- ☐ 3. **Optimization of PSAM for diversity 16-QAM**
 Lingzhi Cao; Beaulieu, N.C.;
[Wireless Communications and Networking Conference, 2004. WCNC. 2004 IE](#)
 Volume 2, 21-25 March 2004 Page(s):1171 - 1174 Vol.2
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- ☐ 4. **Comparative study of pilot symbol assisted modem schemes**
 Torrance, J.M.; Hanzo, L.;
[Radio Receivers and Associated Systems, 1995., Sixth International Conferen](#)
 26-27 Sep 1995 Page(s):36 - 41
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- ☐ 5. **Exact BERs for M-QAM with MRC and channel estimation errors in Rician**
 Yao Ma; Schober, R.; Dongbo Zhang;
[Wireless Communications and Networking Conference, 2005 IEEE](#)
 Volume 2, 13-17 March 2005 Page(s):967 - 972 Vol. 2
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Mitra, S.K.;
[Image and Signal Processing and Analysis, 2001. ISPA 2001. Proceedings of International Symposium on](#)
19-21 June 2001 Page(s):2
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7. **A VLSI architecture for a frequency-agile single-chip 10-MBaud digital QAM receiver**
Kyung-Ho Cho; Putnam, J.; Samueli, H.;
[Global Telecommunications Conference, 1999. GLOBECOM '99](#)
Volume 1A, 1999 Page(s):168 - 172 vol.1a
Digital Object Identifier 10.1109/GLOCOM.1999.831629
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8. **A new timing recovery method for DTV receivers**
Bao, J.; Lu, C.Y.; Da Graca, P.; Zeng, S.; Poon, T.;
[Consumer Electronics, IEEE Transactions on](#)
Volume 44, Issue 4, Nov. 1998 Page(s):1243 - 1249
Digital Object Identifier 10.1109/30.735823
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9. **Performance of an adaptive rate modem using quasi-analytic simulation**
Wickert, M.A.; Hofstetter, P.;
[Microwave Theory and Techniques, IEEE Transactions on](#)
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Wickert, M.A.; Papenfuss, J.;
[Microwave Theory and Techniques, IEEE Transactions on](#)
Volume 49, Issue 8, Aug. 2001 Page(s):1390 - 1397
Digital Object Identifier 10.1109/22.939918
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11. **A 10-gb/s CMOS clock and data recovery circuit with an analog phase interpolator**
Kreienkamp, R.; Langmann, U.; Zimmermann, C.; Aoyama, T.; Siedhoff, H.;
[Solid-State Circuits, IEEE Journal of](#)
Volume 40, Issue 3, March 2005 Page(s):736 - 743
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[AbstractPlus](#) | [References](#) | [Full Text: PDF\(616 KB\)](#) IEEE JNL
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12. **Design of a QPSK/16 QAM LMDS downstream receiver ASIC chip**
Park, K.H.; Shin, D.K.; Lee, J.S.; Sunwoo, M.H.;
[Signal Processing Systems, 2000. SiPS 2000. 2000 IEEE Workshop on](#)
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13. **A QPSK/16 QAM receiver chip for LMDS application**
Ki Hyuk Park; Dae Kyo Shin; Jun Sung Lee; Sunwoo, M.H.;
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28-30 Aug. 2000 Page(s):207 - 210
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14. **Symbol-timing recovery for M-PSK modulation schemes using the signal**
Verdin, D.; Tozer, T.C.;
New Synchronisation Techniques for Radio Systems, IEE Colloquium on
27 Nov 1995 Page(s):2/1 - 2/7
[AbstractPlus](#) | Full Text: [PDF](#)(292 KB) IET CNF
15. **Interpolator for all-digital receivers**
Zhang, H.;
Electronics Letters
Volume 33, Issue 4, 13 Feb. 1997 Page(s):261 - 262
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16. **Optimal design and simulation for multi-rate symbol timing recovery in QPSK demodulation**
Hao Wei; Shen Ming; Zhao Hui;
Computational Electromagnetics and Its Applications, 2004. Proceedings. ICC 3rd International Conference on
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17. **Multiplierless multirate decimator/interpolator module generator**
Shyh-Jye Jou; Kai-Yuan Jheng; Hsiao-Yun Chen; An-Yeu Wu;
Advanced System Integrated Circuits 2004. Proceedings of 2004 IEEE Asia-Pacific Conference on
4-5 Aug. 2004 Page(s):58 - 61
Digital Object Identifier 10.1109/APASIC.2004.1349404
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18. **Farrow structure interpolators based on even order shaped Lagrange polynomial**
Ghadam, A.S.H.; Renfors, M.;
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Volume 2, 18-20 Sept. 2003 Page(s):745 - 748 Vol.2
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20. **Pilot-symbol assisted channel estimation for coherent DS-SS/CDMA communication**
Hai-Wei Wang; Che-Ho Wei;

[Circuits and Systems, 2000. Proceedings. ISCAS 2000 Geneva. The 2000 IEEE Symposium on](#)
Volume 3, 28-31 May 2000 Page(s):383 - 386 vol.3
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Lindoff, B.; Ostberg, C.; Eriksson, H.;
[Vehicular Technology Conference, 1999 IEEE 49th](#)
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- └ **22. Effect of frequency offset on carrier phase and symbol timing recovery in digital receivers**
Hamila, R.; Vesma, J.; Vuolle, H.; Renfors, M.;
[Signals, Systems, and Electronics, 1998. ISSSE 98, 1998 URSI International Symposium on](#)
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Young-Su Kim; Chang-Joo Kim; Goo-Young Jeong; Young-Jo Bang; Han-Kyu Choi;
[Communications, 1997. ICC 97 Montreal, 'Towards the Knowledge Millennium International Conference on](#)
Volume 3, 8-12 June 1997 Page(s):1518 - 1520 vol.3
Digital Object Identifier 10.1109/ICC.1997.595042
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- └ **24. VLSI implementation of on board processing subsystems for satellite communications**
Jamali, M.M.; Kwatra, S.C.;
[Circuits and Systems, 1996. IEEE 39th Midwest symposium on](#)
Volume 3, 18-21 Aug. 1996 Page(s):1235 - 1238 vol.3
Digital Object Identifier 10.1109/MWSCAS.1996.593132
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"clock recovery" AND interpolator AND quadrature

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...b-1-V Operation and Per-Pin **Clock Recovery** Jaeha Kim, Student Member...power-supply regulation, **clock recovery** phase/delay-locked loop...need per-pin multiphase **clock recovery** since they may be connected...open-loop fashion using delay **interpolators** [38][41]. For these techniques...
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...part. The **clock recovery** is based on...analog phase **interpolator** to overcome...traditional analog **quadrature**-phase mixing...cases. The **interpolator's** power consumption...Proposed **Clock Recovery** Loop A particularity of the **quadrature** phase mixing **interpolator** is that it...signals. The **clock recovery** loop, however...
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...phase rotations, perfect carrier and **clock recovery** were assumed. In case of the linear **interpolator** the system delay was minimised, since...shift keying (QPSK) and 16-level **quadrature** amplitude modulation (16QAM). The...schemes were combined with all four **interpolators** and their bit error rate (BER) performance...

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☐ 6. [HotI97.fm](#) [PDF-42K]

May 1998

...delay stages. The **interpolator** adjusts the phase...and initializes the **interpolator** at mid-range. Figure...Delay-Locked Loop Tracking **Clock Recovery** for 4Gb/s Signaling...alternative to the tracking **clock recovery** described above. An...

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☐ 7. [TDA10021HT_4](#) [PDF-41K]

May 2003

...receiver TDA10021HT FEATURES · 4, 16, 32, 64, 128 and 256 **Quadrature** Amplitude Modulation (QAM) demodulator (DVB-C compatible...be ... BLOCK DIA GRAM handbook, full pagewidth MGW343 **CLOCK RECOVERY** I2 C-BUS INTERFACE GPIO AGC PWM PWM TIMING **INTERPOLATOR** RS DECODER OUTPUT INTERFACE JTAG DE-SCRAMBLER DE-INTERLEAVER...

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Nov 2002

He has been the ideal advisor in providing the environment and the facilities that have made this work possible. His demand for excellence, insight, and suggestions have shaped many of my ideas, and made this dissertation possible.

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☐ 9. [Reference-based dual switch and stay diversity systems over correlated Nakagami fading channels - Vehicular Technology, IEEE ...](#) [PDF-58K]

Sep 2003

...pilot extraction/interpolation filter. Assuming a perfect **clock recovery** and that satisfies Nyquist's criterion for zero intersymbol...denotes the variance of that depends on the type of filter/**interpolator** used for the pilot reference recovery, represents the...change of variables enables us to use the GaussChebyshev **quadrature** rules [20, 25.4.38], which have the advantage that their...

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☐ 10. [Digital Communication with AO - 40 and](#) [PS-198K]

Jul 2001

...78 3.4.4 Downconversion and Costas Loop 78 3.4.5 Sampler and **Clock Recovery** 79 3.4.6 Decision Feedback Equalizer...


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☐ 11. [McNEILL : JITTER IN PHASE - LOCKED LOOPS](#) [PDF-48K]


Apr 2003


...Theory ·Original application: PLL **clock recovery** in SONET ·Example of jitter (time...to Transmit Clock RCLK RDATA TDATA **CLOCK RECOVERY** PLL (D.U.T) TCLK DATA SOURCE COMMUNICATIONS...to Transmit Clock RCLK RDATA TDATA **CLOCK RECOVERY** PLL (D.U.T) TCLK DATA SOURCE COMMUNICATIONS...


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- ☐ **12. Multi-channel serdes receiver for chip-to-chip and backplane interconnects and method of operation thereof**
Yang, Fuji / Larsson, Patrick / O'Neill, Jay, UNITED STATES PATENT AND TRADEMARK OFFICE PRE-GRANT PUBLICATION, Mar 2003
...provided to the phase **interpolator** 110 along with the in-phase and **quadrature** phase signals, I and...plurality including a **clock recovery** system having a phase detector and a phase **interpolator**, the **clock recovery** system coupling the...
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- ☐ **13. Method for equalization of a quadrature amplitude modulated signal**
Copeland, Gregory Clark, UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, May 2000
...synchronization and/or **clock recovery** operations, as...operation, an analog **quadrature** amplitude modulated...also includes **clock recovery** circuit 503 and...demodulator 508, an **interpolator** and rate conversion...and Hanzo, Modem **Quadrature** Amplitude Modulation...of carrier and **clock recovery** from QAM signals...
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- ☐ **14. Phase synchronisation device and phase quadrature signal generating apparatus**
Pickering, Andrew James / Joy, Andrew Keith / Simpson, Susan Mary, EUROPEAN PATENT APPLICATION, Apr 1999
...apparatus for generating an output pair of **quadrature** related signals oscillating at a common...provides said output signals. The **quadrature** related signals are advantageously...and means arranged to regenerate the **quadrature** relationship between the clock signals...example implementation of the phase **interpolator** of Figure 4; Figure 6 is a schematic...
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- ☐ **15. Phase Interpolator**
Dunning, David S. / Abhayagunawardhana, Chamath / Drottar, Ken / Jensen, Richard S. / Glenn, Robert, UNITED STATES PATENT AND TRADEMARK OFFICE PRE-GRANT PUBLICATION, Jan 2003
...systems for **clock recovery** are described...of the phase **interpolator** of the present...to a remote **clock recovery** mechanism 17...to reduce the **interpolator** output to very...c. a remote **clock recovery** mechanism comprising...
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- ☐ **16. COMPONENT TIMING RECOVERY SYSTEM FOR QAM**
KNUTSON, Paul, Gothard / RAMASWAMY, Kumar / McNEELY, David, Lowell, EUROPEAN PATENT, Jul 1999
...control input of the **interpolator** so that the sampled signal produced by the **interpolator** represents the value...tolerances between the **quadrature** signals in a QAM...expense is desired. A **clock recovery** circuit for a demodulator...having in-phase and **quadrature** component processing...estimator and an **interpolator** is described in EP-A...
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- ☐ **17. Phase-interpolator based PLL frequency synthesizer**
Chen, Chun-Ying / Le, Michael Q. / Wakayama, Myles, EUROPEAN PATENT, Sep

2003

...reference oscillating signals. The reference signals e.g. are in **quadrature** relationship and have approximately the same frequency. The document Larsson P.: "A 2-1600-MHz CMOS **Clock Recovery** PLL with Low- Vdd Capability", IEEE Journal of Solid-State...

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- ☐ **18. A direct-conversion CMOS radio receiver for high speed paging**

Chen, Zhiheng, Jan 2000

...included. The front-end consists of a differential LNA and a **quadrature** harmonic mixer. In the base-band, an AGC circuit provides...The demodulator is formed by a I-level zero-crossing **interpolator**, **clock recovery** circuits and decision logics. Main functions of the receiver...

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- ☐ **19. A Multi-gigabit CMOS Transceiver with 2x Oversampling Linear Phase Detection**

Vichienchom, Kasin, Feb 2003

...noise due to the bang-bang type phase detector in PLL-based **clock recovery** circuits has been analyzed using this model. The design...40 viii Figure 2.28 Phase **interpolator**...

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- ☐ **20. Clock acquisition and tracking for burst communications**

Frantzeskakis, Manolis / Aretos, Konstantinos, EUROPEAN PATENT APPLICATION, Jan 2001

...relates to the **clock recovery** process in burst...mapping such as **quadrature** amplitude modulation...clock, or by an **interpolator** device. Two variations...one concerns a **clock recovery** circuit for complex...of in-phase and **quadrature** components and the second one, a **clock recovery** circuit based...

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- ☐ **1. A CMOS low-power multiple 2.5-3.125-Gb/s serial link macrocell for high IO bandwidth network ICs - Solid-State Circuits, IEEE ... [PDF-34K]**
Apr 2003
...part. The **clock recovery** is based on...analog phase **interpolator** to overcome...traditional analog **quadrature**-phase mixing...cases. The **interpolator's** power consumption...Proposed **Clock Recovery Loop** A particularity of the **quadrature** phase mixing **interpolator** is that it...signals. The **clock recovery** loop, however...
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Oct 2001
...99 5.2.2 Phase **Interpolator**...Figure 4.24: Received data **eye diagram**...Timing generation using phase **interpolators**...Simplified model of the phase **interpolator**...
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- ☐ **3. HIGH PERFORMANCE INTER - CHIP [PDF-249K]**
Oct 2001
...99 5.2.2 Phase **Interpolator**...Figure 4.24: Received data **eye diagram**...Timing generation using phase **interpolators**...Simplified model of the phase **interpolator**...
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- ☐ **4. HIGH PERFORMANCE INTER - CHIP [PDF-232K]**
Oct 2001
...99 5.2.2 Phase **Interpolator**...Figure 4.24: Received data **eye diagram**...Timing generation using phase **interpolators**...Simplified model of the phase **interpolator**...
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- ☐ **5. E:\alevi\dir.text\dir.bindu\PhD Thesis\BinduThesis.pdf [PDF-793K]**
Nov 2002
..... 68 Fig. 3.14 Measured (a) output **eye-diagram** and (b) output jitter of 9 ps rms (58 ps peak-to-peak) corresponding to 3.2 Gb/s operation of the full- speed flip-flop in...

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- ☐ 6. [Digital Communication with AO - 40 and](#) [PS-198K]
Jul 2001
...78 3.4.4 Downconversion and Costas Loop 78 3.4.5
Sampler and **Clock Recovery** 79 3.4.6 Decision
Feedback Equalizer...
[<http://www.afthd.tu-darmstadt.de/~dg1kjd/telemetry/dip...>]
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- ☐ 7. [A Multi-gigabit CMOS Transceiver with 2x Oversampling Linear Phase Detection](#)
Vichienchom, Kasin, Feb 2003
...noise due to the bang-bang type phase detector in PLL-based **clock recovery** circuits
has been analyzed using this model. The design...40 viii Figure 2.28 Phase
interpolator...
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- ☐ 8. [A multi-gigabit CMOS transceiver with 2x oversampling linear phase detector](#)
Vichienchom, Kasin., Jan 2003
...noise due to the bang-bang type phase detector in PLL-based **clock recovery** circuits
has been analyzed using this model. The design...40 viii Figure 2.28 Phase
interpolator...
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- ☐ 9. [Phase detectors in carrier recovery for offset QAM and VSB](#)
Lin, Thuji S. / Liu, Tian-Min / Krafft, Stephen E., *UNITED STATES PATENT AND
TRADEMARK OFFICE GRANTED PATENT*, Dec 2003
...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery**
loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation
points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-
phase (Q) channel...are subtended by an "eye" **diagram** illustrating the signal...
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- ☐ 10. [DUAL MODE QAM/VSB RECEIVER](#)
JAFFE, Steven T. / LIU, Tian-Min / TAN, Loke, Kun, *EUROPEAN PATENT*, Aug 2001
...QAM/VSB receiver system for recovering **quadrature** amplitude modulated or vestigial
sideband...signal, irrespective of whether it is a **quadrature**-amplitude-modulation
(QAM) or a vestigial...symbols, characterized by in-phase and **quadrature**-phase
portions separated, in time, by...
Full text available at patent office. For more in-depth searching go to  LexisNexis[®]
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- ☐ 11. [Phase detectors in carrier recovery for offset QAM and VSB](#)
Lin, Thuji S. / Liu, Tian-Min / Krafft, Stephen E., *UNITED STATES PATENT AND
TRADEMARK OFFICE PRE-GRANT PUBLICATION*, Mar 2003
...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery**
loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation
points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-
phase (Q) channel...are subtended by an "eye" **diagram** illustrating the signal...
Full text available at patent office. For more in-depth searching go to  LexisNexis[®]
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- ☐ **12. Phase detectors in carrier recovery for offset QAM and VSB**
Lin, Thuji S. / Liu, Tian-Min / Krafft, Stephen E., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Dec 2002
...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery** loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-phase (Q) channel...are subtended by an "**eye**" **diagram** illustrating the signal...
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- ☐ **13. METHODS AND SYSTEMS FOR DIGITALLY PROCESSING OPTICAL DATA SIGNALS**
GOPINATHAN, Venugopal, PATENT COOPERATION TREATY APPLICATION, Feb 2002
...00241 FIG. 3 is an **eye diagram** of a digital signal...00251 FIG. 4 is an **eye diagram** of a digital signal...00261 FIG. 5 is an **eye diagram** of a digital signal...example analog phase **interpolator** that can be implemented...
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- ☐ **14. Technique for minimizing decision feedback equalizer wordlength in the presence of a DC component**
Tan, Loke Kun / Liu, Tian-Min / Hung, Hing Ada T., UNITED STATES PATENT AND TRADEMARK OFFICE PRE-GRANT PUBLICATION, Nov 2002
...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery** loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-phase (Q) channel...are subtended by an "**eye**" **diagram** illustrating the signal...
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- ☐ **15. Timing recovery using the pilot signal in high definition TV**
Liu, Tian-Min / Tan, Loke Kun / Jaffe, Steven T., UNITED STATES PATENT AND TRADEMARK OFFICE PRE-GRANT PUBLICATION, Sep 2002
...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery** loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-phase (Q) channel...are subtended by an "**eye**" **diagram** illustrating the signal...
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Tan, Loke Kun / Liu, Tian-Min / Hung, Hing Ada T., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Aug 2002
...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery** loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-phase (Q) channel...are subtended by an "**eye**" **diagram** illustrating the signal...
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- ☐ **17. Timing recovery using the pilot signal in high definition TV**
Liu, Tian-Min / Tan, Loke Kun / Jaffe, Steven T., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, Jun 2002
...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery**

loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-phase (Q) channel...are subtended by an "eye" diagram illustrating the signal...

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☐ **18. DUAL MODE QAM/VSB RECEIVER**

JAFFE, Steven T. / LIU, Tian-Min / TAN, Loke, Kun, PATENT COOPERATION TREATY APPLICATION, May 2000


...first tracking loop; a variable rate **interpolator**; an NTSC interference rejection filter...symbols characterized by in-phase and **quadrature**-phase portions separated in time by...to sample each of the in-phase and **quadrature**-phase portions of the complex signal at an in-phase sampling time and at a **quadrature**-phase sampling time separated by an...

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☐ **19. Technique for minimizing decision feedback equalizer wordlength in the presence of a DC component**

Tan, Loke Kun / Liu, Tian-Min / Hung, Hing Ada T., UNITED STATES PATENT AND TRADEMARK OFFICE PRE-GRANT PUBLICATION, Sep 2001


...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery** loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-phase (Q) channel...are subtended by an "eye" diagram illustrating the signal...

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☐ **20. Technique for minimizing decision feedback equalizer wordlength in the presence of a DC component**

Tan, Loke Kun / Liu, Tian-Min / Hung, Hing "Ada" T., UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT, May 2001

...multi-rate filter/**interpolator** (HB/VID) 20 which...under control of a **clock recovery** loop, in a manner...In-phase (I) and **quadrature** phase (Q) baseband...constellation points using a **quadrature** synthesizer and complex...channel signals and **quadrature**-phase (Q) channel...are subtended by an "eye" diagram illustrating the signal...

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